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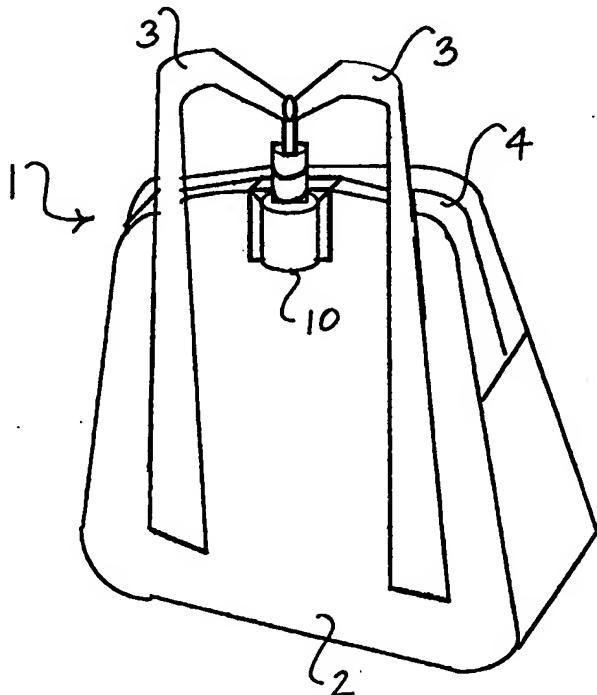
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(54) Title: SELF-WEIGHING SCHOOL BAG

## (57) Abstract

A self-weighing school bag. The school bag has a weight indicator on the backside of the school bag which can be permanently attached to the bag to indicate the weight of the bag when the bag is worn or lifted by the straps. The weight indicator has level lines indicating the weight. Although the lines can be marked in various increments, it is preferred that the shaft be marked so as to clearly indicate the level which would correspond to the weight of the bag that would be considered just above the acceptable load. This zone may be marked in bright red to symbolize warning or prohibition.



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## SELF-WEIGHING SCHOOL BAG

### FIELD OF THE INVENTION

5        The present invention relates generally to the field of book bags, and in particular, to school bags with a weight measuring mechanism which can give an indication of the bag's own weight without requiring the use of any external scale or other weight-measuring device.

### 10 BACKGROUND OF THE INVENTION

In societies where education is highly emphasized at an early age of a child, there is pressure for the children to perform well in school. This pressure creates the temptation for the children to fill their bags with as many books to 15 cover as many topics as possible. School bags, when completely or substantially filled with books, can be very heavy. Often times, the load is too much for some children to handle. Because a child's body has not fully matured, carrying overly heavy bags consistently over a prolonged period can have detrimental effects on their bodies.

20       A general admonition to the children to carry a manageable load of books is often ineffective in preventing the children from carrying too many books. For one thing, what is considered manageable is somewhat ambiguous, and it is difficult to give a quantitative value without employing an external weight measuring device such as a weight scale. Although the scale 25 can be employed to individually measure the weight of the bags, doing so can be both cumbersome and expensive for the schools, as a large number of scales must certainly be provided to handle the large number of students and their bags.

Therefore, it would be both convenient and useful to have a simple mechanism already attached to the school bag which would quickly indicate the weight of the bag without having to rely on any other external device.

## 5 OBJECT OF THE INVENTION

It is therefore an object of the present invention to provide a school bag with a self-weighing mechanism which can indicate the total weight of the bag simply by picking up the bag, and without requiring any other external 10 instrument.

## SUMMARY OF THE INVENTION

The present invention is a self-weighing school bag. The school bag 15 has a weight indicator on the backside of the school bag which can be permanently attached to the bag to indicate the weight of the bag when the bag is worn or lifted by the straps. The weight indicator includes a base having an upside-down "L" shape with a vertical portion and a horizontal portion. On the side of the base opposite to the horizontal portion, is a main body with a 20 tubular bore. The bore in the main body is made such that the diameter of the opening is smaller than the diameter of the bore itself so as to form a ring at the top. Slidably displaced inside the bore is a piston with a circular base and a cylindrical shaft. At the end of the shaft opposite to the base is a hole. Fitted through the hole is a clip. Fitted around the cylindrical shaft is a spring.

25 The weight indicator is located on the back side of the bag where the shoulder straps are typically attached. The weight indicator is preferably located near the top of the bag with the horizontal portion of the base resting against the top portion of the school bag and the vertical portion of the base

resting against the back side of the bag. The shoulder straps are attached to the clip such that when the straps are worn around the shoulders of a person or otherwise lifted by hand, the straps pull against the cylindrical shaft of the piston causing the shaft to protrude out further through the opening, and also 5 causing the spring to compress.

The cylindrical shaft of the piston has level lines to mark the extent to which the spring has been compressed. Although the lines can be marked in various increments, it is preferred that the shaft be marked so as to clearly indicate the level which would correspond to the weight of the bag that would 10 be considered just above the acceptable load. This zone may be marked in bright red to symbolize warning or prohibition.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

15 FIG. 1 is a perspective view of the present invention, the self-weighing school bag.

FIG. 2 is a perspective view of the weight indicator of the present invention.

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#### **DETAILED DESCRIPTION OF THE INVENTION**

FIG. 1 illustrates a school bag 1 with the weight indicator 10 of the present invention. FIG. 2 is a perspective view of the components of the weight 25 indicator 10. The preferred embodiment of the weight indicator 10 includes a base 11 having an upside-down "L" shape with a vertical portion 11b and a horizontal portion 11a. It should be understood, however, that other shapes for the base are possible. On the side of the base 11 opposite to the horizontal

portion 11a, is a main body 12 with a tubular bore 13. Although here the main body 12 is of a triangular shape to reduce the total amount of material, other shapes can work as well.

The bore 13 in the main body 12 is made such that the diameter of the opening 13b is smaller than the diameter of the bore itself so as to form a ring 13a at the top. Slidably displaced inside the bore 13 is a piston 14 with a circular base 14a and a cylindrical shaft 14b. At the end of the shaft 14b opposite to the base 14a is a hole 14c. Fitted through the hole 14c is a clip 15. Fitted around the cylindrical shaft 14b is a spring 16.

The diameter of the circular base 14a should be slightly smaller than that of the bore, and the diameter of the shaft 14b should be slightly smaller than that of the opening 13b such that when the piston 14 is displaced inside the bore 13, only the shaft 14b should be protruding out through the opening 13b. The piston 14 should be able to easily slide inside the bore 13 with the ring 13a preventing the piston 14 from disengaging from the bore 13 by blocking the circular base 14a. The piston 14 should be long enough such that the portion of the shaft 14b having the hole 14c should be outside the bore 13 when the piston 14 is in a resting, i.e., uncompressed, position.

The diameter of the spring 16 should be approximately equal to the circular base 14a of the piston 14 so that it does not slip off the shaft 14b. The spring 16 should preferably as long or slightly longer than the length of the shaft 14b in the spring's resting position, i.e., the spring in its unstretched or uncompressed position. This way, the spring 16 provides a slight tension between the piston 14 and the ring 13a to prevent the piston 14 from excessively moving inside the bore 13 when the weight indicator is not being used to measure the weight of the bag. When selecting the spring, it is important to select one with a proper stiffness such that it is able to compress a sufficient amount when exposed to the weight in the range typical of school

bags filled with books, but without compressing completely in the same range of weight, so as to allow one to discriminate between an acceptable and unacceptable load for the bags.

Now referring back to FIG. 1, the weight indicator 10 is located on the 5 back side 2 of the bag 1 where the shoulder straps are typically attached. The weight indicator is preferably located near the top of the bag with the horizontal portion 11a of the base 11 resting against the top portion 4 of the school bag 1 and the vertical portion 11b of the base 11 resting against the back side 2 of the bag 1. The shoulder straps 3 are attached to the clip 15 such that when the 10 straps 3 are worn around the shoulders of a person or otherwise lifted by hand, the straps pull against the cylindrical shaft 14b of the piston 14 causing the shaft 14b to protrude out further through the opening 13b, and also causing the spring 16 to compress.

Since the magnitude of the compression in the spring is proportional to 15 the force exerted on the spring, the compression level in the spring when the bag is lifted up can be used as a measure of the weight of the bag. Therefore, the cylindrical shaft 14b of the piston 14 has level lines to mark the extent to which the spring 16 has been compressed. The lines, of course, can be marked in various increments. However, it is preferred that the shaft 14b be 20 marked so as to clearly indicate the level which would correspond to the weight of the bag that would be considered above the acceptable load. This zone may be marked in bright red or yellow to symbolize warning or prohibition. When a person wears the bag, it is important that the weight indicator 10 does not impinge against the wearer's back. In the preferred 25 embodiment, the bottom portion of the bag should rest against the wearer's lower back while the portion of the bag where the weight indicator is attached to should be hanging relatively removed from the wearer's back. Depending

on the particular shape and size of the bag, the bore 13 may be angled relative to the base 11 to achieve the optimal configuration.

Although the preferred embodiment has been shown here as a way of illustrating the way to make and use the invention, it is contemplated that there  
5 are other variations of the invention without deviating from the scope of the claims appended herein. For instance, although a spring was described herein in the preferred embodiment, it is contemplated that the spring can be substituted by an elastic member such as a rubber strip, or any other member of elastic material where the force is substantially proportional to the amount of  
10 stretching. Furthermore, although the preferred embodiment of the present invention had the straps connected to the shaft of the weight indicator, the weight indicator may be separated from the straps and have its own handle for weighing the bag. In addition, although in the preferred embodiment the spring was compressed, it is possible to have an arrangement where the  
15 spring is stretched and still perform the function of indicating the weight of the bag.

Therefore, the present invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The presently disclosed embodiments are, therefore, to be considered in all  
20 respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims and all changes which come within the meaning and range of equivalency of the claims are, therefore, to be embraced therein.

**CLAIMS****I Claim:**

- 1 1. A self-weighing school bag comprising,  
2 a bag;  
3 a weight indicating mechanism securely attached to said bag;  
4 whereby a total weight of said bag is indicated by said weight indicating  
5 mechanism without requiring any other external weight measuring device.
- 1 2. The self-weighing school bag as recited in claim 1 wherein said bag  
2 has shoulder straps firmly attached to a backside of said bag such that said bag  
3 can be worn on a person's back.
- 1 3. The self-weighing school bag as recited in claim 2 wherein said weight  
2 indicating mechanism is attached to the backside of said bag.
- 1 4. The self-weighing school bag as recited in claim 1 wherein said weight  
2 indicating mechanism uses a spring to measure the total weight of said bag.
- 1 5. The self-weighing school bag as recited in claim 1 wherein said weight  
2 indicating mechanism uses a elastic member to measure the total weight of  
3 said bag.
- 1 6. The self-weighing school bag as recited in claim 3 wherein said weight  
2 indicating mechanism is further attached to said shoulder straps such that the  
3 total weight of the bag is indicated when said bag is lifted by the shoulder  
4 straps.
- 1 7. The self-weighing school bag as recited in claim 1 wherein said weight  
2 indicating mechanism comprises:  
3 a base,  
4 a main body attached to said base,

5           a tubular bore in said main body,  
6           a piston slidably disposed inside said bore,  
7           a spring fitted around said piston,  
8           a clip attached to said piston, said clip attached to a portion of said bag  
9       such that the spring compresses when said bag is lifted and the total weight of  
10      the bag is indicated by observing the extent to which said spring has been  
11      compressed.

1     8.   The self-weighing school bag as recited in claim 2 wherein said weight  
2   indicating mechanism comprises

3           a base,  
4           a main body attached to said base,  
5           a tubular bore in said main body,  
6           a piston slidably disposed inside said bore,  
7           a spring fitted around said piston,  
8           a clip attached to said piston, said clip attached said shoulder straps  
9       such that the spring compresses when said bag is lifted by said shoulder  
10      straps and the total weight of the bag is indicated by observing the extent to  
11      which said spring has been compressed.

1     9.   A self-weighing school bag comprising,  
2       a backpack having shoulder straps;  
3       a weight indicating mechanism attached to said backpack, said weight  
4   indicating mechanism having,  
5           a base,  
6           a main body attached to said base,  
7           a tubular bore in said main body, said bore having an opening  
8       smaller than said bore;

9                   a piston having a cylindrical shaft and a circular base, said piston  
10   slidably disposed inside said bore with an end of said shaft protruding out from  
11   said opening;

12                   a spring fitted around said piston inside said bore,  
13                   a clip attached to said cylindrical shaft, said clip attached said  
14   shoulder straps such that the spring compresses when said bag is lifted by  
15   said shoulder straps and the total weight of the bag is proportional to the extent  
16   to which said cylindrical shaft protrudes out from said opening of said bore.

1   10.   The self-weighing school bag as recited in claim 9 wherein said shaft  
2   has a line marking a level corresponding to the total weight of said bag.

1   11.   The self-weighing school bag as recited in claim 9 wherein said base  
2   has an upside-down "L" shape, said base having a vertical portion and a  
3   horizontal portion, said horizontal portion resting on a top portion of said bag,  
4   and said vertical portion resting against a back side of said bag.

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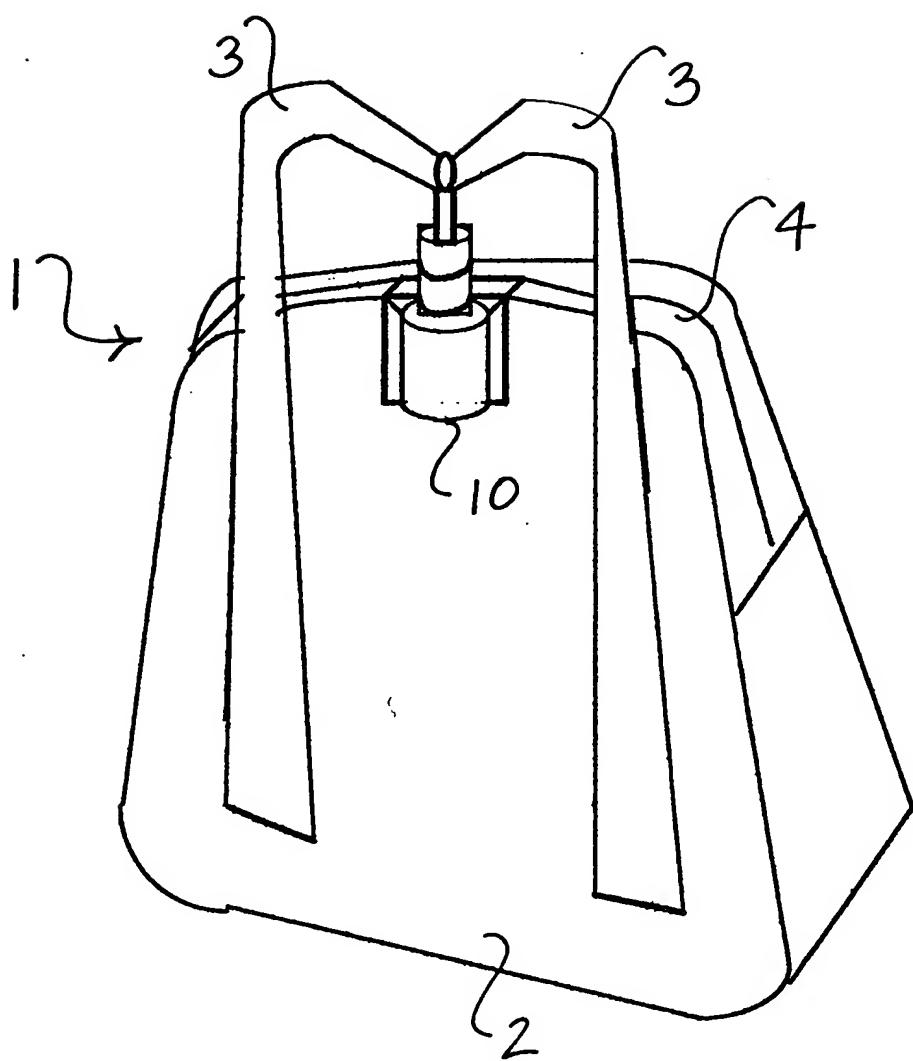


Figure 1

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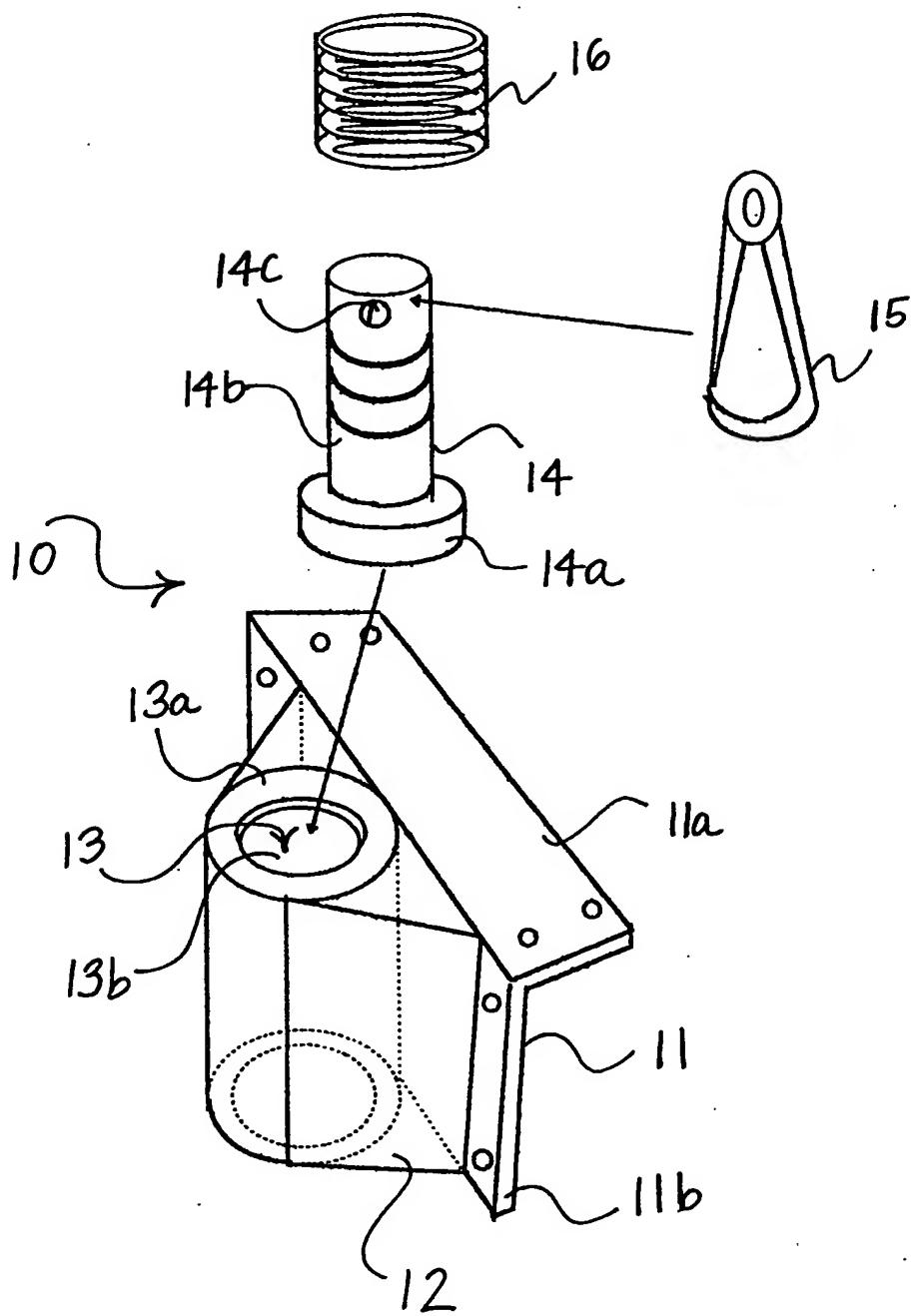


Figure 2